

REMARKS

Entry of this response and reconsideration and allowance of the above-identified patent application is respectfully requested. Claims 1-5, 8-10, 12-20, and 25-36, 38-41 were rejected in the Office Action. Claims 1, 9, 15, 25, 31, 39, 40, and 41 have been amended. Upon entry of this response, claims 1-5, 8-10, 12-20, 25-36, and 38-41 will be pending in the application. No new matter has been added, and no additional prior art searches are required by the amendments.

Applicants would like to Examiner Abrams for conducting a telephonic interview on August 28, 2002.

Claims 1-5, 8-10, 12-20, and 25-41 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over U.S. Patent No. 5,490,040 to Gaudenzi et al. ("Gaudenzi") taken alone, or in view of U.S. Patent No. 5,772,451 to Dozier II, et al. ("Dozier") and U.S. Patent No. 4,878,611 to LoVasco et al. ("LoVasco"). Also, claims 25-30 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Dozier in view of LoVasco. Finally, claims 1-5, 8-10, 12-20, and 25-41 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Dozier in view of Gaudenzi and LoVasco.

Applicants respectfully assert that none of the above references, alone or in combination, teach or suggest the claimed invention, as amended. In particular, none of the references teach or suggest a housing having a hold down that provides strain relief between a surface mount contact and a substrate by allowing the hold down to fuse to the substrate after the surface mount hold

down fuses to the substrate, *during the same reflow process*. In other words, two different connector-to-board connections are formed during one step, *i.e.*, a single pass through the reflow oven.

In the Examiner's primary reference, Gaudenzi does not teach or suggest soldering a standoff to the substrate during the same reflow process that solders the conductive ball to the substrate, as with the present invention. Quite the contrary, Gaudenzi teaches away from such a configuration where it suggests "the pin is usually then soldered in place with, for example, 37/63 solder shown at locations 66" (*Gaudenzi* – column 6, lines 15-17; Figure 8). By applying solder at locations 66, in addition to Gaudenzi illustrating a conductive coil around the pin, Gaudenzi cannot be said to teach soldering balls to the substrate prior to soldering a standoff to the substrate, and during the same reflow process. Instead, at most Gaudenzi teaches simply connecting the pin and the ball to the substrate during a totally different soldering processes not involving a single pass through the reflow oven. This is consistent with Gaudenzi's overarching theme that "[t]he solder balls act as a natural stop and selected pins with built in stops do not need to be specially formed and located to accomplish stand off between the component package and its connected circuitry" (*Gaudenzi* – column 6, lines 21-24).

Similarly, Dozier does not teach or suggest soldering a standoff to the substrate during the same reflow process that solders the conductive ball to the substrate, as with the present invention. Dozier describes a solder ball 314 connection to a substrate 302 that includes a pin

350 that fits within a hole 352 in the substrate (*Dozier* – column 25, lines 48-53). *Dozier* also notes that solder balls tend to self-align when reflowed to the substrate (*Dozier* – column 26, lines 3-6). However, *Dozier* does not suggest soldering the pins to the holes in the substrate after the solder balls are soldered to the substrate, and during the same reflow process. Instead, *Dozier* suggests affixing the pin to the substrate using “a dollop of any suitable adhesive,” which certainly is not practiced during the reflow process that fuses the solder balls to the substrate (*Dozier* – column 25, lines 52-53).


Accordingly, because neither Gaudenzi nor *Dozier* teach or suggest the present invention, as amended, applicants respectfully request withdrawal of the rejection of claims 1-5, 8-10, 12-20, and 25-41 under 35 U.S.C. § 103 (a) over Gaudenzi alone, or Gaudenzi in view of *Dozier* and LoVasco. Similarly, applicants respectfully request withdrawal of the rejection of claims 25-30 under 35 U.S.C. § 103 (a) over *Dozier* in view of LoVasco, and withdrawal of the rejection of claims 1-5, 8-10, 12-20, and 25-41 under 35 U.S.C. § 103 (a) over *Dozier* in view of Gaudenzi and LoVasco.

CONCLUSION

In view of the foregoing, Applicants respectfully submit that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned attorney, Vincent J. Roccia at (215) 564-8946, to discuss resolution of any remaining issues.

Respectfully submitted,

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Marked up versions of claims 1, 9, 15, 25, 31, 39, 40, 41, which are amended herein, showing all of the changes relative to the previous version of each.

1. An electrical connector[,] mountable to a substrate, [and] comprising:

a housing;

a reflowable surface mount contact secured to said housing and adapted to surface mount to a first pad on the substrate during a reflow process; and

a non-surface mount hold down secured inside [to] said housing and adapted to mount to a hole in the substrate [so as to permit said surface mount contact to center on said pad upon mounting to the substrate,] for providing strain relief to the mating of the surface mount contact to the substrate, wherein during the reflow process said non-surface mount hold down fuses to said substrate after said surface mount hold down fuses to said first pad such that said surface mount contact centers on said first pad without contacting another pad on the substrate, and wherein said non-surface mount hold down is adapted to retain said housing a distance from a surface of the substrate.

9. A ball grid array connector mountable to a substrate, comprising:

a housing;

a plurality of contacts within said housing;

a plurality of fusible elements secured to said contacts for mounting to pads on the substrate during a reflow process; and

a hold down adapted to [enter the substrate so as to permit said fusible elements to center on the pads upon mounting to the substrate, wherein said hold down is secured to said housing, and wherein said hold down is adapted to limit flattening of said fusible elements during a reflow process] mount to a hole in the substrate and secured inside said housing for providing strain relief to the mating of a fusible element to the substrate, wherein

during the reflow process said hold down fuses to said substrate after said fusible element fuses to a first pad such that said fusible element centers on said first pad without contacting another pad on the substrate, and wherein said hold down is adapted to retain said housing a distance from a surface of the substrate.

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15. A method of mounting an electrical connector to a substrate, comprising:
 providing an electrical connector having a contact and a hold down;
 providing a substrate having a pad;
 securing said contact to said pad on said substrate during a reflow process;
placing said hold down into a hole in said substrate so as to permit said
contact to center on said pad upon mounting to the substrate without contacting another pad on
the substrate, wherein said hold down is adapted to retain said housing a distance from a surface
of the substrate; and
 securing said hold down to said substrate during said reflow process,
 wherein said hold down is adapted to limit flattening of said contact during [a] said reflow
 process.

25. An electrical connector mountable to a substrate, comprising:
 a housing having a mounting end facing the substrate;
 a plurality of contacts secured to said housing;
 a plurality of fusible elements[,] each secured to a respective one of said
 plurality of contacts; and
 a standoff extending a distance from said mounting end of said housing[,]
and adapted to [wherein said standoff enters] enter the substrate [so as to permit said fusible
elements to center on pads upon mounting to the substrate], [and] wherein said standoff is

adapted to limit flattening of said fusible elements during a reflow process, and wherein during the reflow process said standoff fuses to said substrate after said fusible element fuses to a first pad such that said fusible element centers on said first pad without contacting another pad on the substrate.

31. In a ball grid array connector mountable to a substrate, wherein the improvement comprises a hold down adapted to enter an opening in the substrate, [so as to permit fusible elements on the ball grid array to center on pads on the substrate upon mounting to the substrate, and] wherein said hold down is adapted to limit flattening of said fusible elements during a reflow process, and wherein during the reflow process said hold down fuses to said substrate after said fusible element fuses to a first pad such that said fusible element centers on said first pad without contacting another pad on the substrate.

39. An electrical connector[,] mountable to a substrate, [and] comprising
a housing;
a surface mount contact secured to said housing and adapted to surface mount to a pad on the substrate during a reflow process; and
a non-surface mount hold down secured to said housing and adapted to mount to a hole in the substrate [so as to allow relative movement between said connector and said substrate during a reflow process], wherein said non-surface mount hold down is adapted to limit flattening of said surface mount contact during [a] the reflow process, and wherein during the reflow process said hold down fuses to said substrate after said fusible element fuses to a first pad such that said fusible element centers on said first pad without contacting another pad on the substrate.

40. An electrical connector[,], mountable to a substrate, [and] comprising
a housing;
a surface mount contact secured to said housing and adapted to surface
mount to a pad on the substrate during a reflow process; and
a non-surface mount hold down secured to said housing and adapted to
mount to a hole in the substrate, wherein said hole has a perimeter larger than a perimeter of said
hold down, and wherein said non-surface mount hold down is adapted to limit flattening of said
surface mount contact during [a] the reflow process, and wherein during the reflow process said
hold down fuses to said substrate after said fusible element fuses to a first pad such that said
fusible element centers on said first pad without contacting another pad on the substrate.

41. A method of mounting a connector to a substrate, comprising:
providing an electrical connector having a contact and a hold down;
providing a substrate having pads and a hole;
inserting said hold down in said hole, wherein said hole has a perimeter
larger than a perimeter than a perimeter of said hold down;
securing said hold down to said substrate[, so as to permit said contacts to
center on the pads upon mounting to the substrate], wherein said hold down is adapted to limit
flattening of said contact during a reflow process, and wherein during the reflow process said
hold down fuses to said substrate after said fusible element fuses to a first pad such that said
fusible element centers on said first pad without contacting another pad on the substrate; and
securing said contact to said pads on said substrate.